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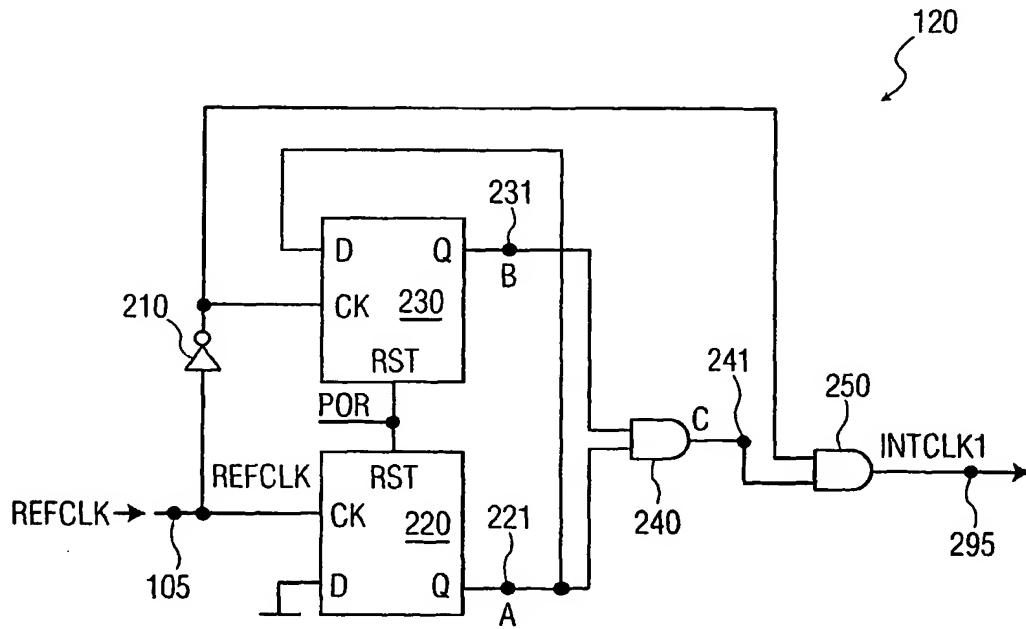
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[Continued on next page]

(54) Title: LOW LOCK TIME DELAY LOCKED LOOPS USING TIME CYCLE SUPPRESSOR



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(57) Abstract: The invention discloses a delay locked loop (DLL) architecture with a time cycle suppressor circuit suitable for use with synchronous integrated circuits containing a clock generator. Utilization of the improved delay locked loop architecture with a time cycle suppressor circuit disclosed herein enables reduction in the lock time of the synchronous circuit.



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
2 December 2004

**Declaration under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

- with international search report

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H03L7/081 H03K5/153 H03K5/13 H03K5/159 H04L7/033

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H03L H03K H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category <sup>o</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 417 705 B1 (TAFT ROBERT C ET AL) 9 July 2002 (2002-07-09) column 11, line 53 - column 12, line 15; figure 10 -----	1-12
A	US 5 001 374 A (CHANG PAUL S) 19 March 1991 (1991-03-19) abstract; figure 2 -----	1-12
A	US 6 088 255 A (MATSUZAKI YASUROU ET AL) 11 July 2000 (2000-07-11) column 24, line 16 - column 25, line 36; figure 16 -----	1-12
A	EP 0 654 907 A (MATRA MHS) 24 May 1995 (1995-05-24) column 7, line 51 - column 8, line 10; figure 4 -----	1-12

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## ° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the International filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

12 March 2004

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13.07.04

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Waters, D

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB 03/05810

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-12

### Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT 3 03/05810

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 6417705	B1	09-07-2002	NONE			
US 5001374	A	19-03-1991	DE JP	4027208 A1 3106112 A	14-03-1991 02-05-1991	
US 6088255	A	11-07-2000	JP JP JP	11273342 A 3526208 B2 11298307 A	08-10-1999 10-05-2004 29-10-1999	
EP 0654907	A	24-05-1995	FR DE DE EP US	2713034 A1 69411511 D1 69411511 T2 0654907 A1 5666388 A	02-06-1995 13-08-1998 12-05-1999 24-05-1995 09-09-1997	